

PATENT APPLICATION
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FOR
PIPETTE STABILIZER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to pipettors having nozzle assemblies configured to accept pipettes of varying diameters, and is concerned in particular with an improvement in the stabilization of the smaller diameter pipettes.

2. Description of the Prior Art

With reference initially to Figure 1, a known pipettor 10 has a generally tubular nozzle 12 with a proximate end 12a connected to the pipettor housing, and with a distal end 12b defining an opening 14 large enough to accept the largest of the pipettes available for use with the pipettor.

A resilient retainer 16 lines the interior of the nose 12. The retainer has an internally ribbed passageway 18 converging from an enlarged diameter entry opening 20 at the open distal end of the nozzle to a comparatively smaller diameter exit opening 22 leading to the air channel 24 of the pipettor.

The larger diameter pipettes are axially inserted through the adjacent aligned openings 14, 20 and are gripped and held air tight by the ribbed wall of passageway 18 at a location intermediate its ends. The reasonably close fit between the larger diameter pipettes and the entry opening 20 provides an acceptable measure of stabilization against tip wobble. However, as shown in Figure 1, because of the substantial radial clearance between the smaller diameter pipettes 26 and the edges of the openings 14, 20, the pipettes lack adequate stabilization and are thus prone to loosely pivot or wobble as indicated diagrammatically by the arrow 28. This wobble makes it difficult to insert the pipette into small necked containers or tubes.

The objective of the present invention is to provide added stabilization for the smaller diameter pipettes, thereby avoiding or at least substantially minimizing pipette wobble.

SUMMARY OF THE INVENTION

In accordance with the present invention, a stabilizing member is provided at the entry opening of the retainer passageway. The stabilizing member is configured and dimensioned to reduce or eliminate the clearances permitting pivotal movement of the pipettes within the
5 confines of the retainer entry opening.

These and other features and advantages of the present invention will now be described in greater detail with reference to the accompanying drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

10 Figure 1 is a partially sectioned side view of a relatively small diameter pipette supported in the nozzle assembly of a known pipettor;

Figure 2 is an enlarged partially sectioned side view of the pipettor nozzle assembly modified by the addition of one embodiment of a stabilizing member in accordance with the present invention;

15 Figure 3 is a perspective view of the stabilizing member shown in Figure 2;

Figure 4 is a vertical sectional view of the stabilizing member shown in Figures 2 and 3;

Figure 5 is a vertical sectional view through the pipettor nozzle assembly and showing an alternative embodiment of a stabilizing member in accordance with the present invention;

Figures 6a-6d are perspective views showing different configurations of stabilizing
20 members of the type shown in Figure 5;

Figure 7 is a bottom perspective view showing in still another embodiment of stabilizing member in accordance with the present invention;

Figure 8 is a vertical sectional view of the stabilizing member and nozzle assembly shown in Figure 7;

Figure 9 is a perspective view of one of the half sections of the stabilizing member shown in Figures 7 and 8; and

Figure 10 is a bottom perspective view showing a modified entry opening for the stabilizing member depicted in Figures 7 and 8.

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DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to Figures 2-4, a first embodiment of a stabilizing member is generally indicated at 30. The stabilizing member includes a tubular sleeve 32 projecting axially from one side of an enlarged diameter flange 34. Partially circular circumferentially spaced ears 36 project axially in the opposite direction from the opposite side of flange 34. The stabilizing member 30 is advantageously molded as an integral unit from a relatively rigid plastics, e.g., acetal, polycarbonate, ABS, etc., with the ears 36 being appropriately configured and dimensioned for removable snap-fit insertion into the opening 14 in the distal end 12b of nozzle 12. The inner diameter of the sleeve 32 is smaller than that of the entry opening 20 of retainer 16, and is sized as shown in Figure 2 to closely confine the smaller diameter pipettes 26. The length "L" of projection of the stabilizing member 30 from the distal end of the nose 12 is preferably at least about 0.5 times the minimum diameter of the passageway 18 extending through the retainer 16.

The stabilizing member 30 may be conveniently separated from the pipettor nozzle when using large diameter pipette tips (those having diameters larger than the inner diameter of sleeve 32), and may be snapped into place prior to usage of smaller diameter pipettes. When in place, the stabilizing member prevents or at least substantially minimizes any tendency of the pipettes to wobble.

With reference to Figure 5, an alternative embodiment of a stabilizing member comprises a relatively thin resilient annular disc 38 located at the entry opening 20 of the retainer 16 and captured within the distal end 12b of nozzle 12. The disc 38 has a central opening 40 sized to closely confine smaller diameter pipettes 26.

5 The annular disc 38 may be variable configured. Thus, for example, as shown in Figure 6a, the central opening 40 may be bordered by radially inwardly projecting teeth 42. Alternatively, as shown in Figure 6b, the disc may have radially outwardly projecting teeth 44, or as shown in Figure 6c, both inwardly and outwardly projecting teeth 42, 44 may be provided. As shown in Figure 6d, the disc 38 may alternatively be provided with a slot 46 that will resiliently
10 expand to accommodate pipette tips of varying diameters.

Still another embodiment of the invention is disclosed in Figures 7-9. Here, the pipettor nozzle 12 is encased by an outer stabilizer comprising mating half sections 48a, 48b pivotally connected to the nozzle as at 50 and resiliently closed by an elastic band 52. The bottoms of the two half sections are tapered inwardly as at 54 to a central opening 56, the diameter of which is
15 again smaller than that of the entry opening 20 of the retainer 16. This inward taper facilitates insertion of the pipettes, and the resiliently pivotal coaction of the two halves 48a, 48b accommodates a range of pipette diameters.

Alternatively, as shown in Figure 10, the bottoms of the two halves 48a, 48b may overlap as at 58 to define a narrow but expandable opening 60.

20 In light of the foregoing, it will now be appreciated by those skilled in the art that by employing stabilizing members in accordance with the various embodiments of the present invention, stability of the smaller diameter pipettes is beneficially enhanced. The stabilizer members may be readily attachable and detachable as shown in Figures 2-4, and as such useful for stabilizing only the smaller diameter range of pipettes. Resilient internal stabilizer members

of the type shown in Figures 5 and 6a-6d can accommodate a wider range of pipette diameters, as can the external split design shown in Figures 7-10.

We claim: